Bioaccesibility Extraction of Hydrophobic Pollutants: Benefits of Separating Leaching Agent and Acceptor Medium

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Published in:
SETAC Europe 25th Annual Meeting

Publication date:
2015

Document Version
Publisher's PDF, also known as Version of record

MO414 Bioaccesibility Extraction of Hydrophobic Pollutants: Benefits of Separating Leaching Agent and Acceptor MediumD.J. Cocovi-Solberg; M. Miró, Universitat de les Illes Balears; A.P. Loibner, Boku, IFA-Tulln / Department for Agrobiotechnology IFATulln; P. Mayer, Technical University of Denmark / Department of Environmental Engineering. Bioaccessibility extractions of organic pollutants from environmental solid samples are increasingly used in environmental risk assessment and management. Recent research has indicated that many bioaccessibility extraction methods have limited sink capacity for hydrophobic organic chemicals, which can lead to underestimation of bioaccessibility. Therefore, several studies have proposed to add a sink to the extraction medium, including the so called contaminant trap, the silicon rod based sorptive bioaccessibility extraction and tenax beads-assisted extractions. While these methods certainly are a step forward, they also lead to challenges related to the separation of sink and matrix and/or the subsequent quantification of the bioaccessible fraction. The present study aimed at developing a new approach for (1) enhancing the sink capacity of bioaccessibility extractions, (2) improving phase separation and (3) facilitating the measurement of the bioaccessible fraction. Cyclodextrin was used as leaching agent, ethanol as acceptor medium and a semipermeable membrane for separating these two phases. Various physical formats of this configuration were developed and tested, and the simplest and highly performing format was further optimized and validated. This new configuration was characterized in terms of mass transfer kinetics, analytical performance criteria and suitability for direct analysis by high performance liquid chromatography (HPLC) and gas chromatography (GC). Finally, the developed method was applied to PAH contaminated soils and the results compared to results obtained with other existing methods.